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AN ESSAY
ON THE
CANINE STATE OF FEVER;

BY NATHANIEL CHAPMAN,
OF VIRGINIA, HONORARY MEMBER OF THE PHILADELPHIA
MEDICAL AND CHEMICAL SOCIETIES.

Juvenis arcum flectere tentat Ulyssis.

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.....
1801.

Professor Munro is
with the Compliments
of the Author.

AN INAUGURAL DISSERTATION

FOR

THE DEGREE

OF

DOCTOR OF MEDICINE;

SUBMITTED

TO THE EXAMINATION

OF THE

REVEREND JOHN EWING, S. T. P. PROVOST,

THE

TRUSTEES AND MEDICAL FACULTY

OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE EIGHTH DAY OF JUNE

1801.



TO BENJAMIN RUSH, M. D.

PROFESSOR OF THE INSTITUTES,

AND OF

CLINICAL MEDICINE,

IN THE

UNIVERSITY OF PENNSYLVANIA,

"THE SYDENHAM OF AMERICA;"

THIS ESSAY

IS INSCRIBED,

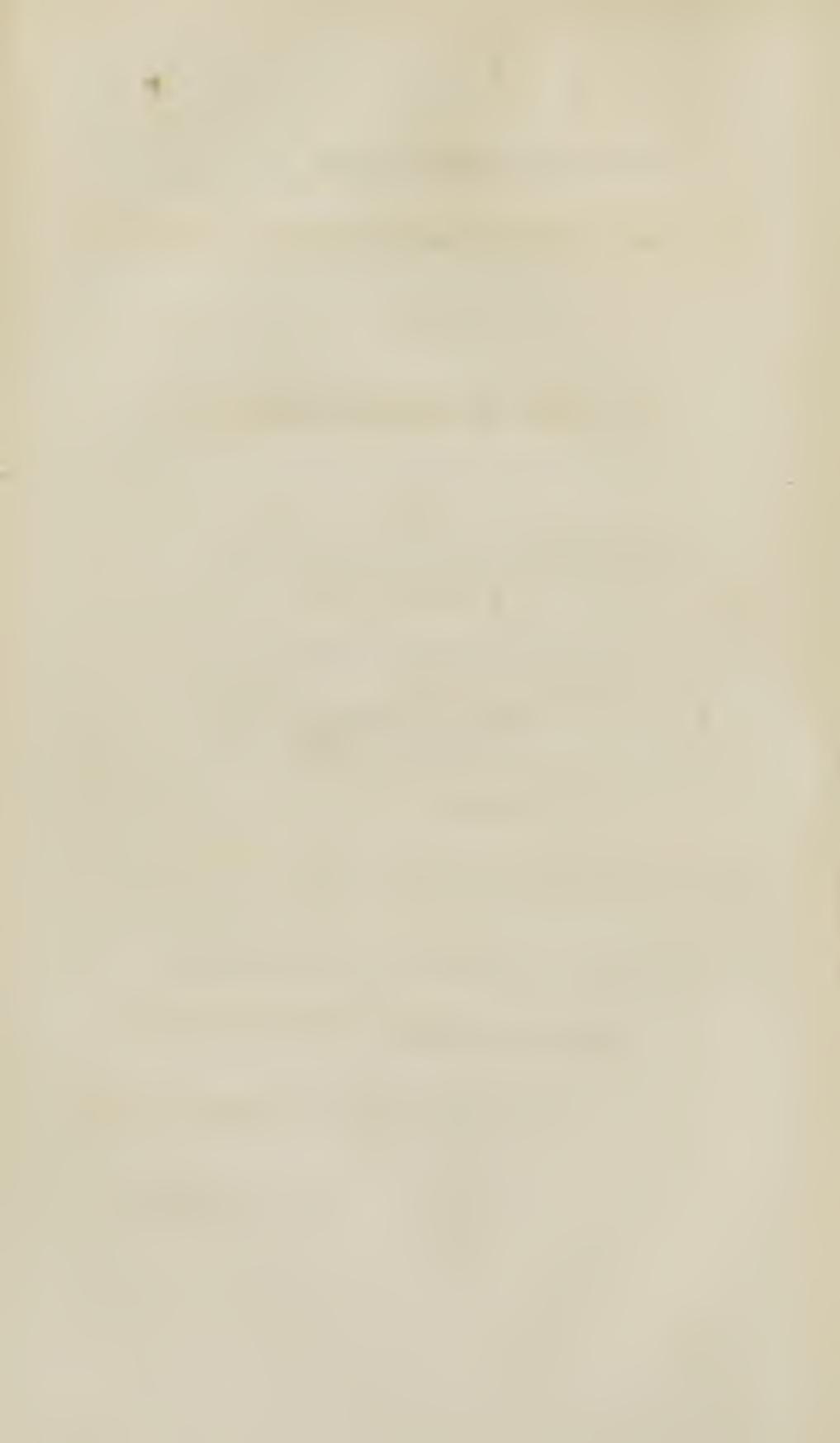
AS THE GENUINE TRIBUTE OF

RESPECT, ESTEEM, AND GRATITUDE,

FROM AN OBLIGED

AND AFFECTIONATE PUPIL,

THE AUTHOR.



TO RICHARD PETERS, JUNIOR, ESQUIRE,

AND

TO MR. THOMAS BIDDLE,

THIS

ESSAY

IS ALSO INSCRIBED,

AS AN ASSURANCE OF

THE FERVENTY OF MY FRIENDSHIP,

AND OF MY

HIGH CONSIDERATION.

THE AUTHOR.

I have always thought it a greater happiness to discover a certain method of curing, even the slightest disease, than to accumulate the largest fortune; and whoever compasses the former, I esteem not only happier, but wiser and better too.

SYDENHAM.

INTRODUCTION.

CREDULITY is the ignis fatuus of science. It sheds an attractive, but delusive glare, which diverts from truth and philosophy. In no science is it of more pernicious tendency than that of medicine, and no where does it more abound. The annals are little more than the records of falsehood, and the monuments of superstition and ignorance. To scrutinize existing opinions, is held to be scepticism; and an attempt to controvert them, intolerant heresy. He who is orthodox in medicine, must close his ears to the dictates of Reason, and “listen with credulity to the whispers of Fancy,” and the phantoms of imagination. These remarks are peculiarly applicable to the disease which will constitute the subject of this Essay.

To detail the various opinions and speculations that have been advanced, would be recounting the caprices of the human mind, and offering insult to the dignity and philosophy of the science I profess.

Some of them were mere ephemera, the short lived beings of the day, who scarcely existed before they were consigned to eternal oblivion.

Ostendunt terris, hunc tantum fata, &c.

“ Fate shew’d them...but so quickly drop’t the scene,
“ ’Twas straight forgot that they had ever been.”

While others sustained an existence till superseded by theories equally absurd and untrue.

From the collision which attended this clashing of opinion....this warfare of theory, was sometimes emitted a spark which illumined for the moment. But it was the temporary meteor of the night..... It vanished before any definite conclusion could be drawn; and left the subject in augmented darkness and obscurity. In examining, therefore, the opinions of my predecessors, I shall be excused if I sometimes betray scepticism, and often doubt and hesitation, in admitting them. At this enlightened æra, when science is pervaded by the illuminating rays of reason and philosophy; error is to be rejected, though sanctioned by the continuance of custom, or fortified by hosts of antiquated authorities.

Although the formidable and mysterious nature of the disease, early arrested attention, and solicited the inquiries of the speculative philosopher and practical physician, it remained, till of late, the confessed “ *approbrium medicorum.*” The various efforts to explore its dædalian intricacy were baffled, and investigations, often repeated, only lead to indefinite results and unsatisfactory conclusions. From the experience of our predecessors, we derive little, either to conduct the elucidation of its pathology, or direct its

cure. Their writings contain numerous facts and observations, but perplexed by their diversity, and confounded by their contradiction and obscurity. The horror excited by the alarming aspect of the disease, and the apprehension of its communication by dissection, have occasioned a timidity highly unfavourable to its successful investigation. To professor Rush, "the medical veteran of the western world," whose labours have contributed more largely than those of any other, to the improvement of medical science, and the consequent amelioration of the sufferings of mankind, we are indebted for having advanced a theory which so completely explains the various phenomena of the disease, that there seems to be wanting nothing further upon the subject. It is not, however, universally assented to. An ingenious but unsuccessful attempt, has been recently made to controvert it.* To give it support by some additional arguments, and by those which have already been employed, presented in a different view, will be the leading object of the following pages.

It may be thought, that I have not entered into the discussion of some particulars, so fully as their importance required. But as almost every point has been treated copiously by voluminous writers, I did not view it necessary to notice them further, than was subservient to the consideration of the particular theory which I vindicate.

To the reader, some apology is necessary, for the crude and imperfect execution of this Essay. I

* The pamphlet entitled, an "Examination of Professor Rush's Arguments," &c. by Dr. Mease, is what is alluded to.

must plead the trite excuse, of the shortness of the time allowed for preparing a Thesis; the inexperience of extreme youth, and the employment of pursuits highly unfavourable to happiness in composition, or success in scientific research.

Nothing but a compliance with an indispensable duty, imposed by an institute of the university, could have induced me thus prematurely to have published it. To the “*lim&a labor*,” it has never been subjected. I submit it then, to the tribunal of the public, with the flattering hope of its receiving all the indulgence which candour, with justice, can bestow.

ON THE
CANINE STATE OF FEVER.

THE disease, which I am now to consider, has been called the Rabies Canina, from its being imparted most commonly by the bite of a rabid dog; and Hydrophobia, from one of its most prominent and distressing symptoms. But neither of the terms appropriately designate it; for the maniacal state is not a uniform occurrence,* and the aversion to water should be considered rather as an anomalous symptom, than one of its determinate characters.† Nor does the term convey a correct import of the effect

* Salius de affect. part. c. 19. Casalpinus, Art. Med. l. 3. c. 34. Cordonchius de Rab. l. 1. c. 1. Aromatorius, Diss. de Rab. p. 2.

† Patients have died within the usual period of two or three days, with other symptoms of this disease, without discovering the smallest dread or dislike of water. Arnold, 186. Hildanus mentions a case, in which the aversion to water did not occur, but was characterised with the other symptoms of the disease. It is related by Morgani, that patients, in some instances, are so far from having the aversion to water, that they solicit to have it brought to them. Meade relates three cases, in which this affection did not occur. p. 163. Cases are also mentioned by Lieutaud, and many other writers.

of water upon the suffering patient; which appears from the most correct observation, not to consist in an actual horror; but is consequent entirely upon a difficulty of deglutition, from an association of the pain induced by former attempts to swallow.*

This disease, says Dr. Meade, should have been called *Δυσκαταποσίς*, a difficulty of swallowing, rather than *τρόφοβία*, a dread of water.

Although this term conveys a true description of the symptom, it should not be employed. To derive a name from a single character of a disease, is always improper. It misleads, by fixing attention upon a casual appearance, to the neglect of more important considerations.

In this inquiry, I shall assume the liberty of calling the disease the canine state of fever. This term not only associates it with the other states of fever, but particularly designates it, by the expression of its most uniform remote cause, namely, the canine virus.

Nasologists have divided this fever into different species, according to the animal affected; but as I consider it precisely the same, whatever may be the subject of its aggression, I shall not admit the distinction; nor do I conceive the difference supposed from the varied mode of its origin, to be better founded. There is but one remote cause of disease, which is stimulus; and it is immaterial, whether the morbid or irregular excitement, be induced by the canine virus, or the usual remote causes of fever.

* The Hydrophobia seems to resemble the case of a man, who shuns a draught which was before found nauseous, or shrinks from a pain already experienced.

HISTORY OF THE DISEASE.

THE curiosity commonly entertained, of inquiring into the antiquity of diseases, excites a regret that the early notices should be involved in such contradiction and uncertainty.

The result of researches instituted to establish the precise æra, when canine madness made its appearance, has lead to nothing determinate or satisfactory. All attempts to ascertain the point at this remote period, must be fruitless and abortive.

The disease is not mentioned by Hippocrates. Cælius Aurelian^{us}* is the first writer who treats upon the subject ; and from his having entered into a long discussion of the question, “ Whether Hydrophobia was a new disease or not? †” it is probable that it had arrested little attention before his time. It is asserted by Plutarch and Le Clerc, that the disease originated

* C. Aurelian. lived in the time of Tragan and Hadrian.

† C. Aurelian^{us}, p. 226.

in the time of Asclepiades ; † but there is undoubted authority of its more remote antiquity. In the Iliad, || the figure of canine rage is repeatedly employed, to illustrate the vehemence of turbulent and exasperated passion ; which fixes its prevalence at least as early as the time of Homer.

Respecting the occurrence of diseases at different periods, there exists some diversity of opinion; but the weight of authority decidedly inclines to the affirmation of the question. The ancient writers were especially of this opinion. Thus Celsus, Pliny, Bar-chusen, Plutarch, Dio Cassius, Claudinus, not to mention others, have either given descriptions of new diseases, or acceded to the opinion.

The small-pox, measles, lues venerea, sibbins, &c. are confessedly of modern origin: and Glison assures us, that the ricketts had not appeared above thirty years antecedent to the publication of his treatise upon the subject. This question admits of a wide scope of speculative inquiry; but in a practical view, its decision is of no importance. In its particular relation to canine madness, there can be no great difficulty in forming a conclusion.

Those animals ~~who~~ are subject to the disease, *which* have existed at all times, and doubtless must have been equally liable to its attack.*

† Asclepiades practised medicine in Rome, about the sixty-second year of the Christian æra.

|| Iliad, lib. ix. lin. 237, et lib. viii. et xiii.

* I am aware, that it is a received opinion, “ that throughout the scale of animated nature, a general law prevails, whereby certain diseases belong to certain animals exclusively.” Thus it has been asserted, and ge-

From the earliest accounts, has been the opinion of the disease affecting only that class of animals comprehended in the genus *canis*. It has indeed been asserted, that it sometimes spontaneously occurs in other animals, and particularly in the species of the genus *felis*. Thus it has been observed by Morgani, that cats are not unfrequently the subjects of its attack: and Aurelian takes notice of its occurrence in leopards. Boerhaave seems also to accredit the accounts of its underived origin in domestic poultry; but such instances are considered as anomalies of the general law of the disease. This opinion, though sanctioned by the almost unanimous voice of writers, appears to me to be one of the numerous errors interwoven with this subject. It originated in ignorance, and has

nerally accredited, that the small-pox, syphilis, &c. are not communicable to any other class of animals except the human species. But the fallacy of this conclusion is proved by some recent facts. The following extract sufficiently establishes the position I have assumed:

" A peasant of the county of Essex, seeing a great many children carried off by the natural small-pox, was desirous of inoculating his two boys; one nine, the other twelve years of age. Not being able to employ a surgeon, he collected the scabs of a child then sick of the disease, powdered them, and sprinkled the powder upon slices of bread and butter. The two sons eat them, and gave a bit to the house-dog. They had a mild small-pox, and got well without any remarkable accident. The dog remained sick for two or three days, drinking a great deal, and refusing to eat; on the fourth day he had a very decided variolous eruption; on the ninth, the pustules were full ripe, and dried up, and fell off like those of the two children. An English author says, he has observed the same epidemic in a flock of sheep, the greater part of which were affected, and communicated it to two cows, one of which died. The symptoms that manifested themselves in these animals, in the course of the disease, were in every respect the same as are observed in the human species."

BULLETIN DE LA SOCIETE PHILOMATIQUE, &c.

been perpetuated by a blind attachment to authority. To suppose a disease peculiar to any class of animals, is not only unphilosophical, but unwarranted by fact and observation.* That it more frequently occurs in the canine species, I am not disposed to deny. I do not, however, admit that it is ascribable to an idio-syncracy of their œconomy favouring peculiarly its generation, but to the greater exposure of dogs to its productive causes. Perhaps also, too great a latitude is given to this belief. It may equally occur in other animals; but from their remote connection with us, the disease eludes our observation; while, from the domiciliated habits of dogs, it must attract attention in every instance.

It is singular, that almost every circumstance, connected with this disease, has been the subject of dispute; and that authors have altercationed not only upon the more abstruse points, but have differed about the most obvious facts. Among the points of controversy, none has excited more attention than the question, "Whether the disease can be induced in the human species by any other cause than the virus of a rabid animal ?

Although it is denied by far the greater number of modern writers, yet it appears to me, that its spontaneous production is so well attested, as scarcely to be wanting of further confirmation. Facts, in support of the opinion I have embraced, are numerous and conclusive.

Boerhaave relates a case of malignant fever, brought on by exposure to the rays of the sun, as-

* Vide Note pages 12, 13.

sisted by the intemperate use of spiritous liquors, in which the hydrophobic affection occurred to a very great degree.* Salius Diversus, saw Hydrophobia occur in a pestilential fever.† It is taken notice of by V. Sweiten, as succeeding to dysentery.‡ Meade mentions it as symptomatic to a palpitation of the heart, “ to so great a degree as not to differ from that of true Hydrophobia.”|| Sauvage informs us, that he saw a malignant fever accompanied with an aversion to fluids.§ Dr. Coste remarks its happening in the sixth day of a putrid fever ;** and Dr. Trotter, its frequent appearance in the typhus fever, in the British navy.†† In the yellow fever, it was observed by Dr. Griffitts,‡‡ and it has occurred more than once in the hydrocephalic state of fever, in Philadelphia.|||

A well marked instance is related by Mr. Thedon, of Berlin, attending pneumonic inflammation. The most remarkable case, however, is recorded by Mr. Innes, as consequent upon an inflammation of the stomach. §§

But notwithstanding the numerous well authenticated cases of the spontaneous occurrence of Hydrophobia, it is still doubted, whether it has ever existed as an idiopathic affection : While it is admitted that the terror of water has often attended diseases, in-

* Van Sweiten, Comment. on Boerhaave. p. 143.

† S. Diversus De Fevre, p. 362. † V. Sweiten, vol. xi. p. 144.

|| Meade on Hydrophobia, p. 81. § Sauvage Nosology Meth. v. i. p. 354

** Med. Comm. v. ii. p. 476. †† Med. Nautica, p. 301.

‡‡ Rush's Inq. vol. v. p. 214. ||| Ibid. 214.

§§ Edin. Med. Essay, vol 1. p. 226.

duced from other causes than the canine virus, it is contended, that such cases should be considered only as symptomatic.

This reasoning is perfectly correct; but it applies with equal force and aptitude to every instance of the disease, in whatever manner induced; for in no case should the aversion to water be considered as the idiopathic affection. The primary disease is a fever, and the Hydrophobia, but a casual symptom. With equal propriety might the aversions to air, to light, to aliment, which are so frequently the concomitants of fever, be considered as the original disease. Much mischief has pervaded medicine by naming diseases from a single character; but the remark more particularly applies to the canine fever. It has always directed attention to this accidental symptom, and totally diverted it from the actual disease.

In addition to the facts which have been related, the opinion of the power of the human system to generate the disease, is fortified and supported by numerous authorities. Aretœus decidedly conveys this opinion in the following passage.....“ Alia millena “ corum, quæ in homine sunt, eandem speciem cum “ exterioribus causis obtinent: succi corrumpentes “ (interne et externe: morbi quo que medicamentis) “ perniciosis assimiles; et a medicamentis talia vo-“ munt, qualia ob febres vomere solent.”* Cælius Aurelianus, also says, “ Est præterea possibile, sine “ manifesta causa hunc passionem corporibus in-

* Aretœus de caus et sign morb.

“ nasci.”* Boerhaave believed it to be produced most commonly by derivation, yet “ it appears,” says he, “ both from history and observation, to have arisen spontaneously in some acute diseases.”†

It is expressly asserted by Van Sweiten, that Hydrophobia has arisen in human bodies, “ without any received poison from a mad animal,” and in corroboration of the opinion, adduces an instance of the disease being excited in a man by a paroxism of passion, to such a degree, that he fell “ into apparent suffocation, even at the thoughts of mere mentioning of “ water : and soon after perished perfectly raving, “ having first vomited up a uniform green and bilious “ matter.”‡

I shall omit the mention of the different animals which have been enumerated by authors as exclusively capable of receiving and propagating the disease ; for I hold the distinction to be unfounded ; and consider the capacity to be possessed in common by all ; not excepting man.||

~~I cannot, however, so certain that the disease can be imparted by the bite of a mār. Dr. Arnold could not communicate it to dogs or rabbits, by inoculation with the saliva of a Hydrophobic patient.~~ §

An inquiry now offers of much more importance: It is to ascertain the manner of the communication of the disease. For if we accredit the assertions contained in the records of medicine, there is no poison

* C. Aurels. Accut. Morb. 219. † Bœrhaave, Apb. 1130.

‡ V. Sweiten, Comment. p. 143. vol. i.

|| Sauvage, Diss. Sur. la Rag. § Arnold, p. 183.

more contagious, or so diversified in the manner of its communication, as the canine virus : But the belief in its contagiousness seems to have been unwarrantably extended by the ancient physicians, as many of their assertions have been contradicted by more accurate inquiries, while others yet remain insulated, and without the confirmation of subsequent observation.

This diversity of the mode of communication is so great, that it is difficult to arrange them, and still more to comment upon them with precision.

The disease is said to have been imparted by the breath ;* by the slaver taken upon the lips or tongue, as biting off a thread which had been used in mending a rent in a garment made by the bite of a mad dog ;† and, likewise by kissing a rabid animal.‡ It is said to be received by a scratch made by the claw of a mad cat ;|| and by a wound inflicted with an instrument which had been employed years before in killing a rabid animal.§ Instances are also related of its having been conveyed by the saliva taken into the stomach ;** by eating the flesh, †† and milk of animals which have died of the disease ; and lastly, by dissection.

In the detail that I have thus given of the varied avenues by which this virus is said to assail the system,

* C. Aurel. Aretæus, Børhaave.

† C. Aurel de Morb. Acct. lib. iii. Hildanus, Obs. Chirurg. p. 62.
Hamilton on Hydrophobia, p. 22.

‡ Palmarius et Shenkius, Obs. Med. p. 848.

§ Hildanus Ob. Chirurg. p. 62. || Schenkius, Ob. Med. p. 848.

** Palmarius de Morb. Contag. p. 267. †† Fernilius

I have noticed many *asserted facts*, which I am persuaded should be viewed in no other character than fabulous traditions of credulous ignorance.

It is well known that the flesh and milk of infected animals have been eaten with impunity ; and that dissections have often been performed without any morbid consequences. The universal escape of the attendants upon the subjects of the disease, who are exposed to every source of exhalation from the bodies, argues strongly against the possibility of the communication by the breath, or any other vehicle of contagion. Reasoning from analogy, there could be no hesitation in denying the fact, of the disease being imparted by the saliva taken into the stomach ; since it is ascertained that other poisons exert no operation when swallowed, as that of small pox,* syphilis,† viper,† &c. It has lately been demonstrated by experiment, that absorption does not take place from an entire surface ;|| consequently, the tales of Palmerius, Shenkius, &c. respecting the communication by kissing, and the deposition of the slaver upon the skin, must be considered as fabulous and unfounded. Upon the whole, it appears sufficiently established that the disease is rarely or never communicated but by the bite ; and that no other caution is necessary in the intercourse with the subjects of its attack, than to guard against the bite of the infected animal, and to avoid the contact of the slaver or saliva with an ulcer or abraded surface.

* Rush's Inq. Append p. 7. † Hunter on the Venereal. † Meade's Works, p. 37. || Rousseau's Inaug. Deport, published 1800, U. P.

It is time to be done with the idle fictions of our predecessors. They have swayed already too long. Let us now think and observe for ourselves, and directing our inquiries by the lights of philosophy and reason, which have lately illumined the science of medicine, we shall arrive at certainty and truth.

The unfounded tales upon the subject of the communication of the disease, have led to much mischief. They have excited a timidity and cautious solicitude, which have prevented, not only the exercise of those attentions, towards the unfortunate sufferers which humanity inculcates, and the successful treatment demands, but they have operated to retard the progress of the investigation of the disease.

There is no circumstance connected with this subject, of greater curiosity, of more mysterious complexion, and difficult explanation, than the length of time which the virus will often remain in the system in a state of inactivity. It is not, however, without analogy. Instances are related, in which the variolus matter existed in the system for months without producing its effects.* But such instances are of rare and anomalous occurrence. This is not the case with the canine virus. It observes no certain or determinate period in its attack, for the disease has appeared in all the intermediate periods, from the third day† to an indeterminate length of time. Cœlius Aurelianus, says, a year or more.‡ Galen informs us, that he saw a case which appeared after

* Rush's M. S. Lect. † C. Aurelianus, Accut. Morb. p. 219. ‡ Ib. p. 219.

a year ;* and Dr. Meade, one after eleven months.† The result of Dr. Hamilton's elaborate research into this question, has been, the affixing the tenth day as the earliest, and nineteen months as the latest period of its appearance, from the reception of the bite. There are, however, cases recorded, where the attack was protracted to the extent of twenty, if not forty years, but they are derived from apocryphal authority, and impose but little credibility. The most common period of the attack, according to Aurelian, Meade, and Hamilton, is from twenty to forty days ; and it is more than probable, that where the interval has been longer than a few months from the reception of the bite to the appearance of the disease, that it is induced by some other remote cause. There have been many causes assigned for this variety in the period of the attack, such as the contiguity of the part bitten, to the salivary glands, or its sensibility; the ferocity of the animal which inflicts the bite, or the period of the disease in the animal that bites; the irritability of the habit, &c. &c. but no definite or satisfactory solution has yet been advanced upon the subject.

* Comment. ii. in i. Prorrhæt. Hippocrat. † Meade's Works, 78.

HISTORY OF THE SYMPTOMS.

THE symptoms of the canine fever are so numerous and diversified, that I shall not enter into a minute consideration of them, but content myself with the mention only of the more prominent and commanding appearances.

At an indeterminate time from the reception of the bite, the virus discovers its having taken effect, by pain and uneasiness in the part wounded; which is followed by darting lancinating pains throughout the body, but more particularly about the region of the stomach, with weight, heaviness, and pain of the head. These symptoms are accompanied or succeeded by a sense of coldness, palid face, chills, frequent yawnings and stretchings, pains in the bones, nausea, loss of appetite, great lassitude, languor, debility, pain in the back and extremities, low spirits, anxiety, uneasiness of the extremities, with an inaptitude to muscular exertion. A fever, with heat, flush-

ings of the face, thirst, perversion of taste, flatulencies, irructions, pain about the scrobiculus chordis, a burning sensation in the stomach, and vomiting, follow the other symptoms. The pulse, at this time, generally indicates great irregularity of the arterial system, being tense and charded; the pain about the præcordia is increased, the respiration is difficult, oppressed and laborious, with other marks of pneumonic congestion and inflammation; accompanied with delirium, and sometimes "rage and fury." The disease being aggravated by a recumbent or horizontal posture, the patients generally sit up, but if they lie down, great inquietude and uneasiness is evinced by tossing and restlessness in bed. The countenance is often ghastly; the eyes staring, red, wild and inflamed, expressing strongly the excessive excitement of the system. The sleep, which is rarely obtained, is of short duration, and disturbed by frightful and alarming dreams. There are frequently violent and irregular affections, such as palpitation of the heart, with spasms, and convulsions of different parts of the body, accompanied with a pulse quick, unequal and irregular, but tense and charded. In some instances a remarkable difference in the pulse of the two arms has been remarked. The heat is sometimes ardent, and diffused over the body, but in other instances confined to particular parts: thus the extremities are often cold, while the body is preternaturally warm, *et e, contra.*

Such are the phenomena of the early stage of the disease. The succeeding, is marked by an increase of the foregoing symptoms, and is followed

by a sense of tightness and stricture, about the throat and fauces ; which occasions the pain and difficulty of deglutition, especially of fluids ; and from the recollection of the pain attending former attempts to swallow, such an aversion is induced, that the sight of fluids, or any transparent object, which renews the association, creates the most distressing emotions, and often spasms and convulsions.

The sensibility of the system now becomes so exquisite, that it cannot bear the slightest impression ; light is painful to the eyes, the air of ordinary temperature produces the sensation of coldness, when inspired, and the slightest noise, or even a blast of air, will excite convulsions. Vomiting, at this period, frequently occurs, in which a glutinous, brown, bilious matter, or porraceous bile, is discharged.*

It is impossible to contemplate the situation of a subject of the disease, at this stage, but with emotions of horror and regret. To an increase and aggravation of all the symptoms, is added, an aspect expressive of horror and despair ; the muscles of the face are distorted, the eyes fierce, "dismally wild, red, and inflamed," with the pupil much dilated, gaping of the mouth, lolling of the tongue, which is dry and rough, with a collection of froth about the mouth. These symptoms are attended with great heat and thirst, which, however, cannot be allayed, for the very sight of water excites horror and convulsions, and often madness.

* Beerhaave, p. 165. Meade, p. 78.

At the moment of phrenzy, attempts will be made to spit the frothy slaver which is collected about the mouth, upon the attendants; but at placid intervals, a solicitude will be expressed that it may be avoided.

This froth now becomes extremely troublesome, and in the abortive attempts to expel it, which are incessantly repeated, there is heard a peculiar noise, which a prepossessed, or excited imagination, would compare to the barking of a dog".* At this advanced stage of the disease, the tendency to spasms and convulsions is greatly increased, and frequently dysury and strangury occur,† accompanied with false vision, dulness of sight, and sometimes actual blindness. The spasms which pervade the whole system at this period, sometimes attack the muscles subservient to the movement of the lower jaw, inducing an involuntary grinding of the teeth, which has been represented as a disposition to bite.

The system becoming exhausted, the pulse is weak and intermittent, the extremities are cold, with clammy cold sweats, and attended with sighs, hiccup, convulsions, and death.

Such are the symptoms of the ordinary progress of the disease, but they are varied in different subjects, and diversified as in other diseases.

Thus, in some instances, from the commencement of the attack, the system is prostrated by the force of the impression, and the pulse will indicate little derangement. There is also considerable variety in

* Hildanius, p. 365. and Meade.

† Meade, Lister, and other writers, take notice of the "venetri frequens erectio cum seminis involuntarii jactu."

the maniacal affection; sometimes it occurs at an early period, and continues, with temporary intermissions, through every stage of the disease; while in other instances, the unimpaired enjoyment of the senses has been possessed to the last.

The aversion to fluids, which has been held as truly characteristic of the disease, is not an universal concomitant. There are many cases related, in which it did not exist; nor does it observe uniformity in the period of its occurrence. It is sometimes manifested at an early stage, but in a majority of instances, it does not occur till towards the close of the disease.

The notices of the state of the pulse in this disease, are few and imperfect. Physicians, deluded by the false opinion of its spasmodic nature, have devoted little attention to the examination of the state of the arterial system. But in those instances where it seems to have attracted careful observation, it is very generally described as irregular, with other indications of febrile action. Admitting that cases have occurred in which the pulse was regular and undisturbed, yet it forms no objection, as the same thing has been often noticed in other malignant fevers;* it is to be attributed to the force of the attack prostrating the system, or the remark has probably been made from an unacquaintance with the different morbid states of the arterial system; for upon no subject

* Dr. Rush, treating of the yellow fever, says, "it frequently came on with a weak pulse; often without any preternatural frequency or quickness, and sometimes so low as not to be perceived without pressing the artery at the wrists." He ascribes it to the remote cause acting with so much force upon the arteries, as not to admit of their being excited into quick and convulsive motions.

in medicine, does there exist more error and ignorance, than that of the pulse.

Even at this time, its frequency is considered as the only state affording a diagnosis of fever; when, from its liability to be influenced by diet, exercise, the passions of the mind, and many other causes, it really furnishes the most equivocal and uncertain indication.

The following states of the pulse, have been noticed in this, in common with other malignant fevers, which strongly indicate the analogy.

1st. A hard full pulse,* such as occurs in pleuritic and other states of inflammatory disease.

2d. A pulse quick, hard and irregular.† This pulse frequently occurs in yellow fever.

3d. ‡A pulse quick, small, hard, trembling and

* "In the morning I was sent to bleed him; the people about him thought that he had got a cold. When I came, I found him feverish, with a hard full pulse." *Nours's case. Phil. Trans. of the year 1737, 8. No. 445.*

"He complained of some pain in the wounded eye, and in his head; appeared to be rather dull, and listless, with a slight fever, and other symptoms usually attending a cold, and it was believed that his complaint originated from that source only."

The pulse is thus noticed :

Pulse about 100—In the evening 110—Mid-night 120. Complained at the same time of dysury. *King's case, Med. Rep. vol. 1. p. 281.*

† "His pulse was quick, hard, and irregular, and he had strong palpitations of his heart. His tongue was white, but did not appear dry." *Bellamy's case.*

"About three days after cicatrising the wound, the child was seized with a fever, disordered pulse, and palpitation of the heart."

Lister's third case, Phil. Trans. vol. iii. p. 281.

‡ "His pulse was quick, small, hard, and irregular. His eyes had a particular keenness, and all his motions were quick and vehement; his pulse was also quick, and sometimes trembling and irregular."

Bellamy's case.

irregular, indicating inflammation of the viscera. It has been frequently remarked in malignant fevers, and especially in the phrenitic state.

4th. A pulse strong, but intermitting.* This state of the pulse commonly occurs in pestilential fevers, and indicates, perhaps, most strongly, disease of the arterial system.

5th. A pulse full, quick, hard and tense. This pulse is commonly observed in the pleuritic, maniacal, and in open cases of yellow fever. It strongly indicates inflammatory action.†

6th. A pulse uncommonly frequent, without much tension. This state occurs in chronic, malignant fevers. In the remarkable case of chronic hydrophobia, related by Dr. Arnold, the pulse is noticed at 125 and 128 strokes in a minute.

In Lister's case the pulse is noticed as "trembling and disturbed," and in another stage of the disease, he adds, "that he had now a violent fever upon him, with a quick pulse." *Phil. Trans. vol. iii. p. 277.*

* "His heat was much increased, and his pulse intermitted every fifth or sixth stroke, but on the right side only." *Ib. 2d. case, p. 280.*

"His pulse was then much stronger than the over night, but intermitted in the right side only, as before.

"His countenance was somewhat more ghastly, yet his veins very full, as in initio, et augmentis febris. *Ib. 280.*

"His heat was very great, and his pulse very high, and intermitted then in both wrists. *Ib. 281.*

† "His pulse rather full and quick, though not remarkably so; his countenance strongly marked with anxiety. The next day, "pulse quick and hard." His face was much flushed, and his eyes staring and watery. Complained of the buzzing of flies before him." *Babington's case.*

"Pulse 120 in a minute; his breathing laborious, his tongue moist, and covered with a white mucous; his respiration was frequent, irregular, and laborious." *Haughton's case.*

"His pulse imparted to the fingers the same kind of quick and tense stroke, which is common in the open forms of yellow fever.

Case of Oakley's boy. Rush's Inq. vol. v. p. 220.

In the very interesting case communicated by Mr. Johnson, the pulse is described, in the first stage of the disease, as being “ quick and hard.” It is again noticed, as being at an hundred and fifteen strokes in a minute, with “ an *unusual tremor* in it.” At a succeeding period, it is noticed at an hundred and four strokes, accompanied with a “ white and foul tongue, and the fauces red.” At a more advanced stage, it arose, after the use of the pedeluvium, to an hundred and twenty strokes, and at the same time his eyes are described as “ dismally wild, red, and inflamed.” It is impossible to review the history of this case, without blushing for the fallacy of medical opinion. It has marked an æra in the theory and cure of hydrophobia. From the want of success in the treatment, by *limited and insufficient bleedings*, professor Rutherford, who attended the case, was induced to relinquish the theory of inflammation, and to embrace the opposite doctrine.

He made this revocation publicly. Enslaved by the weight of professorial authority, physicians have servilely, and unconditionally, embraced the doctrine ever since. It was reserved for my illustrious preceptor* to break the shackles of this imperious prejudice, and straighten the crooked and perverted conceptions upon this subject.

Of the appearance of the blood drawn in this disease, our knowledge is extremely limited. It has been rarely noticed: but what is collected from the casual mention of writers, is highly favourable to

* Dr. Rush.

the opinion of the febrile nature of the disease. In Bellamy's case, the blood discovered " *slight traces of size, with serum, remarkably yellow.*" It is noticed by Meade as " thick and black." That drawn in Lister's second case, " was well coloured, but very ~~black~~ ^{thin}." Dr. Rush says, that it was *uncommonly sizy*, in the case of Oakley's boy. The blood taken from admiral Rowley's son appeared a " *little inflamed, and somewhat sizy.*"

In Mr. Bathier's patient " it was rather thick, long of separating, the serum tending to viscosity, and greenish." I am informed by Dr. Spence, an eminent physician of Virginia, that the blood drawn in a case of the disease under his care, was " *highly inflammatory.*" In Johnson's case " the blood was not sizy, but abounded with serum, the crassamentum of a florid scarlet colour, and its texture loose," which is precisely what we should suspect in a case of such malignity. The sizy appearance of the blood is very generally, but erroneously, supposed to indicate the highest grade of morbid action. This appearance, which is often of casual origin, and always of doubtful indication, never occurs but in diseases of inferior grade, or where there has been a reduction of action by depletion. It is in cases only of great malignity, that dissolved blood, *with crassamentum of scarlet colour*, is seen : perhaps it indicates the highest grade of diseased action.

Having thus given a general account of the symptoms which are observed in this disease, together with the pulse and appearances of the blood, I shall

now proceed to the consideration of the appearances which have been noticed upon dissection.

These, though varied in different subjects, are precisely analogous to what occur in malignant fever. They are, inflammation, adhesions, congestion, effusion, extravasation, gangrene, and unusual aridity of the viscera, and other parts.

Upon opening the head, the effects of a copious determination of blood to every part of the contents of the cranium, are strongly manifested*. The inte-

* " Dissections generally discover the vessels of the brain distended, the sinus longitudinalis full of fluid blood, not coagulated, as usual in most other diseases of the head ; the brain and spinal marrow drier than ordinary ; the pericardium without liquor, the lungs loaded, the arteries full of blood very fluid, and hardly concretable in the open air." *Meade*, p. 82.

" The dura mater contained within its sinuses concretions ; beneath this membrane were some bubbles of air. All the vessels of the brain were full of blood, so that the choroid plexuses were black : there was no extravasation of serum. The substances of the cerebrum and cerebellum, were rather dry than moist." *Morgani*, p. 167.

" In the meninges, the vessels were extremely distended with blood, and the internal surface of the brain was every where distinguished with bloody points, and a kind of bloody filaments. In the lateral ventricles was a small quantity of serum, and that a little reddish." *Ib.* p. 160.

" The vessels of the meninges, both arterial and venous, were immoderately full of blood, and that, as it was in every other part, very black. In the ventricles of the brain, there was a yellowish water, to about the quantity of three ounces." *Ib.* p. 172.

" There was a distention of the pia mater on the surface of both hemispheres, with a limpid fluid. The quantity of fluid in the lateral ventricles at the basis of the brain, and round the spinal marrow, appeared to be somewhat unusual." *Ferriar's Med His.* p. 205.

The following was the result of several dissections, communicated by Mr. J. Fabroni to sir Joseph Banks.

" The viscera were uniformly healthy, except in one subject, in which the lungs were found adhering to the pleura; but in all of them, the brain was observed to be more loaded with blood than usual."

guments of the brain are found considerably inflamed, and the medullary substance either streaked, or marked with bloody points.

In the ventricles there is contained a preternatural quantity of effused fluids, of different colour and consistence. The vessels and sinuses are uncommonly turgid, and distended with blood ; and between the membranes and interstices of different parts, extravasations and effusions frequently occur.

In the thorax, the lungs have been noticed inflamed, and adhering to the neighbouring parts ; but the most uniform appearance, is a state of *engorgement*,* as in pneumonia notha. They are sometimes

* "The lungs appeared wonderfully distended and inflamed with the black blood with which they were swollen throughout."

Hernand. rerum mex. Med. Thesaur. p. 494.

"The lungs on all sides cohering with the pleura, were filled with a mass of concreted blood, which rendered them impermeable, or stuffed up, and when cut into, they appeared as a clot of blood."

Bonet. Sepul. Anat. tom i. p. 342.

"The lungs on their whole posterior part, were not only black, but even swollen from the blood, as it seemed stagnated within them."

Morgani.

"*Pulmo pleuræ adherens concreti sanguinis molem referebat.*"

Lieutaud, Hist. Anat. Med. tom. i. p. 445.

"*Pulmones coacervato omni fere cruento incredibiliter plenos.*"

Boerhaave. Aph. 1146, vol. i.

"*Inter cadaveris, exenterationem, occurrit vesicula fellis bile nigerrima repleta, pulmones conspiciuntur nigri et graveolentes.*"

Lieutaud, p. 515.

"In the thorax the lungs, to use the words of Boerhaave, were *coacervato omni fere cruento incredibiliter plenos*, "that is, incredibly filled with almost all the crassamentum of the blood, collected and condensed together," and in their back part, might even be said to be affected with gangrene."

Morgani, 171.

"There were some adhesions of the pleura covering the right lobe of the lungs, to that lining the ribs, on the same side: the left lobe

of a dark black colour, with vesicles upon their surface, as if raised by cantharides: inflammatory appearances have been also noticed upon the surface of the diaphragm. A preternatural state of the heart has been rarely observed; but the ventricles have, in some instances, been found distended with coagula of blood; and the surface adhering to the pericardium. The arteries are generally filled with fluid blood, so much dissolved as scarcely to be concretable when exposed to the air, and the veins nearly empty.

In the abdomen, the stomach bears many marks of diseased action; perhaps more than any other part of the body.† In it, is discovered, almost uniformly, a quantity of dark, grumous, foetid fluid, often pe-

was so completely filled with blood, as to have acquired considerable weight and solidity.”

Ferriar's 2d case.

“ The left lobe of the lungs was black, with the vesicles full of black blood: the surface in some places, which the blackness had not covered, appeared blistered, or if raised by cantharides.”

Philos. Trans. quoted by Ferriar.

In the lungs there was evidently an accumulation of blood, and more in the right side, than in the left. The pleura in its natural state, but the vessels on the surface of the diaphragm, seem rather more turgid than usual.”

Babington's case.

“ In the lungs, were found considerable marks of inflammation.”

Cullen's Clinical Lectures, p. 173.

“ Lungs much inflamed, and towards the back part, of a livid appearance.”

Rhode's case, from Hamilton, 365.

† The following is the result of Morgani's dissections, relating to the stomach: “ The stomach once turgid with air, and its vessels distended with blood: its internal coat once corrupted, and the others distinguished with red spots; five times, indeed, a moisture was observed in it: but once much, three times little, once yellowish, once green, once of a yellow colour, degenerating into green, once extremely yellow, once cineritious, twice viscid, once not viscid.”

p. 176.

In Ferriar's first case, the stomach exhibited marks of inflammation, “ and was half full of a dark fluid.”

Med. Hist. 206.

culiarly offensive; its internal surface inflamed, "and the vessels which creep through it, as much distended as they appear when injected." A gangrenous and mortified state of the villous coat has been repeatedly remarked, and a similar appearance has also been noticed in the intestines and urinary bladder. The liver partakes of the general disease of the viscera. Bartholine mentions its being inflamed, and adhering to the other viscera. The gall-bladder is found filled with a bile, dark and fœtid. Respecting the state of the organs of deglutition, dissections afford results sometimes vague, and often contradictory. It is, however, sufficiently established, that they are frequently affected.* Inflammation, and other effects of morbid action, have been repeatedly noticed. In some cases, appearances of dark, livid spots, have been observed upon bodies after death, and more particularly about the neck and throat.

" On opening the stomach, the villous coat was found to be generally inflamed in irregular points, and there was an appearance of abrasion, similar to that remarked in Johnson, my former hydrophobic patient."

Ferriar's 2d case.

" Non tantu œsophagus, sed et ventriculus, et intestina inflammata rubescabant in alio cadavere." *Hernand, rer. Mex. Thesaur.*

In a dissection of a case, which I attended, the stomach exhibited many marks of inflammation. "It also contained the dark fluid which so frequently occurs in yellow fever." This case is detailed in the medical Repository.

* An inflammation of the organs of deglutition, is noticed by Van Sweiten as a very common occurrence. *Comment. vol. iii. p. 561.*

Meade relates, "that the fauces were greatly inflamed."

Fauvry also mentions the "gula being inflamed, and the linea aspera in some measure also." "The fauces were found much inflamed."

Philos. Trans. vol. v. p. 369.

Inflammatory appearances have also been remarked in the œsophagus, pharynx, and larynx, by Morgani, Zwingerius, and other writers.

REMOTE CAUSES IN DOGS.

1. SCANTY or putrid aliment. That the disease is produced in dogs by feeding upon putrid aliment, although denied by Drs. Parry* and Heysham,† is fully attested. The learned Boerhaave, and his excellent commentator, Van Sweiten, are decidedly of this opinion. It is also taken notice of by Young, in his annals,‡ as being derived from this cause.

The following important fact is related by Dr. Mease :||—“ At the conclusion of the late war, and before that period, all the horses, and other animals, that died in the city, were carried out and suffered to putrify there ; and it is well known, that at this period madness was a most common disease among the dogs, that used constantly to devour the carrion ; but of late it more rarely occurs among them, since the former practice is no longer suffered ;” and I am assur-

* Parry’s Dissert. de rab. Canina. Edin. 1778.

† Heysham. Dis. Inaug. de Rab. Canina. Edin. 1777.

‡ Animal food in a state of putridity, is among the most frequent causes of canine madness. “ Canine madness chiefly arises from the excessive number of ill-kept and ill-fed dogs. Young’s Annals. vol. xvii. p. 561.

|| Inaug. Diss. p. 6.

ed, that during the period of the Potowmac fisheries, where large quantities of fish are suffered to remain in a state of putrefaction, that the prevalence of the disease among dogs to a very great extent, is the uniform consequence.

2d. Extreme heat or cold. The peculiar aptitude of dogs to receive the disease, during the prevalence of excessive heat, has been often remarked. It had early arrested the observation of physicians.* Hilary, considers it as endemial to tropical climates ; † but the extremes of temperature, either heat or cold, appear equally favourable to its production. Van Sweiten relates from *Ætius*, that it is most frequent in those countries where the violence of winter and summer are equally excessive ; and it is unquestionably established, that during the intense cold weather in this country, the disease not unusually occurs. There is nothing singular, in such opposite causes producing a unity of effect. Heat and cold, in their moderate application, may have a different operation ; but in excess, the effect is precisely the same ; inducing a state of debility, which, either direct or indirect, constitutes the predisposition to disease.

3d. A deficiency of water. The conviction of the influence of this cause has been so generally impressed, that it has attracted legislative interposition ; and accordingly, provisions have been made in some countries for the supply of water, at the period of deficiency ; ‡ but from the circumstance of the ex-

* *Ægineta*, p. 74. *Ætius*, p. 107. *Dioscorides*, p. 423.

† *Diseases of Barbadoes*.

‡ *Mosely on Tropical Diseases*, p. 33

emption of the island of Antigua, from the disease,† where there are no springs, or other sources of water upon the island; this opinion is much weakened, if not totally invalidated.

4th. A pestilential state of the atmosphere. The astonishing influence, and all-powerful agency of certain states of the atmosphere, not yet clearly defined, in the production and aggravation of diseases, has been long acknowledged by philosophical physicians. To Hippocrates we are indebted for having first lead the way in unfolding the doctrine of a certain constitution of the atmosphere fitted to the production of particular diseases; which was adopted by Celsus, pursued by Sydenham, revived by professor Rush, and applied in the interpretation of the recent epidemics of his country, with the happiest success: and completely established by the elaborate exertions of Mr. Webster.

In tracing the history of epidemics, we are struck with the intimate connection of the canine fever, with the train of diseases which mark the period of pestilence. Thus, during the plague which raged in Flanders, in 1587, the prevalence of canine madness is particularly noticed. *Webster, 167.*

In the year 1734—5, it prevailed as the concomitant of pestilential diseases. *Ib. 232.*

In the year 1785, this disease made its appearance in the northern states, and raged to a considerable extent; which continued in 1786. At this time,

† This fact is asserted by Dr. Parry, on the authority of Dr. Samuel Athill, of that island.

the prevalence of the scarlatina anginosa is mentioned. It again appeared in 1789, accompanied with various physical phenomena, which mark the existence of a morbid state of the atmosphere.

Ib. 281, 286.

In 1797, it prevailed in Rhode-Island, Massachusetts, and Connecticut. A malignant dysentery existed at the same time, in the latter of those states.

Med. Repos. p. 549.

" In the spring of 1783, canine madness broke out in Hispaniola, and in the month of June in Jamaica, where it raged until March, 1784. It was said at first, that it was brought to Jamaica from Hispaniola, but experience proved the fact to be otherwise. The common notion, that this disease among dogs, can only proceed from the poison of an external bite, or that it originates in some particular dog from internal disease, and from thence is disseminated, has excluded the idea of spontaneous madness arising from some peculiar influence in the air. But this influence of the air generated canine madness in the year 1783, in the West-Indies; for it was general, and many dogs were seized with it, that had no communication with others, and some dogs that were brought from Europe and North-America, and that were not on shore, went mad, on their arrival in the harbours of the island."*

* Moseley on Tropical Diseases, p. 44.

REMOTE CAUSES

IN THE

HUMAN SPECIES.

THESE are numerous. It has been a received opinion, that the disease is only induced by the application of the canine virus ; but repeated experience shews the fallacy of the conclusion. The following are the most uniform causes which produce it :

- 1st. The vicissitude of temperature. Dr. Arthaud has furnished three cases, brought on by the persons sleeping in the open air during the night.
- 2d. Wounds in a tendinous part.* 3d. Great thirst. 4th. Involuntary association of ideas.† 5th. Eating beach-nuts.‡
- 6th. Putrid aliment.|| 7th. Spiritous liquors.**
- 8th. The narcotic stimuli; viz. datura stramonium,§ camphor, &c.

* Darwin's communication to Percival. † Percival's Letter to Heysham. Rush's Inq. vol. v. 235. ‡ Med. Museum, vol. i. p. 226.

|| Trans. Society Phila. ** Boerhaave. § Cooper's Inaug. Disser.

9th. The bite of a rabid animal.

These causes operating upon the system, induce a state of debility, either direct, or indirect, which constitutes the predisposition, or inviting condition to the disease.

PROXIMATE CAUSE.

This is a subject which has always been involved in darkness and obscurity. To travel back into the records of medicine, to refute, or even notice the various speculations, and opinions, which have been advanced, would be a pursuit, equally useless and uninteresting. It has been fully illustrated by Dr. Rush, that the primary seat of fever is in the blood-vessels, and accordingly, the proximate cause of this state of fever, must be the same as that of others, consisting in a preternatural excitement, accompanied with irregular or convulsive action (or the absence of all action from the force of stimulus), but determined to particular parts, according to the existing predisposition.

I have now come to the consideration of the nature of the disease. I enter upon it with uncommon pleasure, as I hope to unfold a theory which will lead to its successful treatment. But before I proceed to the immediate inquiry, I shall take a hasty view of the doctrine which supposes the disease to consist in debility and relaxation. This, I confess, appears to be no better founded, than the many ~~idle~~

hypotheses which have been advanced upon the subject; and, with me, the only circumstance which entitles it to exclusive consideration is, its having been advanced by the high authority of professor Rush, and now ranking among its advocates, the respectable names of Mease, Percival, and many others.

The principal arguments which have been urged in support of the opinion, are derived from,

1st. Analogy, or the occurrence of similar symptoms in tetanus.

2d. From the operation of the canine virus, as a sedative.

3d. From the want of success attending the treatment by depletion.

Before any proof can be deduced from the analogy of the disease with tetanus, it should be established, beyond the possibility of controversy, that the latter disease consists in debility and relaxation; for if the contrary is made to appear, the whole of the deductions growing out of the position, are totally invalidated.

From an attentive inquiry into the causes and symptoms of tetanus, I am convinced, in contradistinction to the prevailing, and received opinion, that it is a disease of violent grade, pervading the whole system, and affecting the blood-vessels, producing fever.

This I deduce from the following considerations:

1st. From the causes that produce it, which are acknowledged to exert a powerful agency upon the system, and in their ordinary operation, to induce fever. These are; the vicissitudes of heat and cold,

marsh miasmata, fatigue, wounds, the bites of poisonous serpents ;* and, lastly, the most powerful stimuli, such as the *datura stramonium*, camphor, hemlock, dropwort, and ardent spirits.†

2d. I infer it, from its occurring at that period of life, and in those constitutions most subject to fever. Dr. Cullen has asserted, " that although it may attack persons of all ages, yet it appears to attack those of a middle age, more frequently than older or younger ; the male sex, more frequently than the female ; and the robust and vigorous, more frequently than the weak.||

3d. From its symptoms. These are, in the commencement, nausea, and vomiting,§ which are followed by breathing short, quick, and irregular, in some instances ; by an increase of heat of the body, delirium ; by costiveness, strangury, and sometimes miliary irruptions ;** and, where it terminates in death, by cold extremities, and a clammy moisture or sweat.††

4th. From the state of the pulse. This, in general, is either full and hard, or small, quick, and irregular ;‡‡ but seldom more frequent than natural. In some instances where the disease has proceeded from cold, succeeding to heat, fever, with other marks of inflammatory diathesis, are considerable.|||

5th. From the blood. The blood, when drawn, rarely exhibits the inflammatory crust, but is gene-

* Dr. Barton's M. S. Lectures. † Ibid. ‡ Girdlestone's Essay.

|| Cullen's Practice, p. 144. § Cullen and Girdlestone.

** Cullen. †† Girdlestone.

‡‡ Hillary Obs. p. 224. Chalmers, p. 93, 95. Cullen. Edin. Med. Comm. p. 472. ||| Hillary.

rally of a looser texture than usual, and does not coagulate as when natural ; is of a less florid colour, and is sometimes covered with dark spots.*

6th. It partakes of the nature of malignant fever in the manner, and period of its termination. This, when it ends in death, is some day before the seventh, but in many instances, in 24, 36, and 48 hours ; when in recovery, the convalescence, like that of fever, is protracted for three or four weeks.† Like malignant fever also, there is a tendency after death, to rapid putrefaction. Dr. Rush relates a case in his lectures, of a boy who died of tetanus, becoming so putrid, that it was considered unsafe to open him, a few hours after death.

7th. I support it to be a malignant fever from the success which has attended depletion in its cure, and particularly blood-letting. Here, I am aware, the weight of authority is against me ; but it should be observed, that the prevailing theoretical notions upon the subject of the disease, have prevented the employment of the practice, consequently the instances of its success are much limited. But has the opposite practice been successful ? Let the united voice of physicians, and the common experience of mankind, declare ! The existing doctrine, then, I hold to be erroneous, for no theory can be just which does not lead to a uniformly successful practice.

Although the practice of bleeding in tetanus, has been very generally condemned, yet there are not

* Hillary, p. 148, and 226. Ed. Med. Com. p. 472.

† Hillary, p. 225. Cullen.

wanting authorities who advocate it, or particular instances of its successful employment. The Spanish surgeons in the colonies, employ blood-letting very extensively.* It is recommended by Hillary in cases induced from cold,† and doubtless must be equally proper in every instance of the disease. The practice should in no case be determined from the remote cause, but by the state of the system. It is advocated by Chalmers also; but under the impression of its facilitating the operation of other remedies. The practice, however, does not rest solely upon the recommendation of authority; its propriety is confirmed by examples of its success. Mr. Alexander used it successfully in a violent case of the disease, which had resisted other remedies.‡ Dr. Currie, of Liverpool, cured a case by it.|| It was employed by Dr. Barton, successfully, in a case which had braved every other means of relief. And Dr. Mackey, an eminent practitioner, in Virginia, employed it in three cases, with the happiest effect.§

The propriety of this practice is further attested, by the successful treatment of the disease by other depleting remedies, such as the cold bath, emetics, purges, relaxing enemata, &c. the operation of which is precisely analogous to that of blood-letting, only not so direct or effectual.

II. From the operation of the canine virus as a sedative:

* Moseley, p. 499. † Hillary, p. 239.

‡ Treatise upon the Croup, p. 66. || Lond. Med. Mem. p. 155.

§ Cock's Inaug. Essay on Tetanus, published in 1798, U. P.

The doctrine of sedatives having been almost universally rejected, it is hardly necessary to comment upon this argument. This opinion of the operation of canine virus, is derived from an attention only to its secondary effects. It is the property of this poison, in common with other stimuli, to induce, in their secondary operation, a state of debility and relaxation. Thus opium, alcohol, æther, &c. first stimulate and augment the excitement, but soon leave the system in a state directly opposed to their first impression: precisely analogous are the effects of poisons, contagions, miasmata, &c. They all ~~immediately~~ induce a state of debility, which invites the accession of fever, the uniform consequence of their application. There can be no doubt, but that the operation of all powers applied to the system, is exactly the same, differing only in degrees of force, permanency and diffusibility; that they have the common effect of augmenting the excitement, but ultimately of inducing indirect debility; and that if there be a sedative, it acts by the removal of the irritating cause, such as blood-letting or cold, which are equally evacuants.

III. From the success attending the treatment by depletion.

As the consideration of this argument, at present, would be anticipating another part of my subject, I shall defer it, until I come to the treatment of the disease.

Such are the principal arguments, adduced in support of this opinion. That they are impotent, and fallacious, I think, must evidently appear. Let us

now examine the proofs, in support of the theory, which supposes the disease a malignant state of fever. These, I shall divide into such as refer to the disease in dogs, and those which go to the establishment of the same point in the human species.

I. The disease in dogs is a malignant fever. This is supported by several considerations, and

1st. From the same causes inducing it, as other states of fever. These have already been enumerated.

2d. The appearances of fever are exhibited in dogs, when affected with the disease. Such as want of appetite, melancholy, peevishness, indicated by snarling, and a propensity to bite; panting, and difficult respiration; great heat, a dull, heavy, fiery, red, inflamed, watery eye, delirium, and madness. The last symptom is not a uniform occurrence: dogs have been known throughout every stage of the disease, to retain their senses, and continue their affectionate habits.

3d. The disease prevails at the same time with epidemics. The intimate connection of the canine fever, with the period of pestilence, I have already noticed.

4th. The disease resembles malignant fever, in the observance of exacerbations, and remissions.†

5th. The appearances upon dissection are precisely analogous to what occur in malignant fever. Dr. Meade tells us, that in dissecting a dog, which had died mad, the fore-part of the dura mater upon the brain, about an inch above the eye-brows, was found inflamed, and even ulcerated, the ulcerations

† Hamilton, p. 15, vol. I.

piercing through this membrane.* In a dog, dissected by Dr. Cooper, there occurred inflammation, and effusion.†

Finally. It is supported, by the success, which has attended the treatment by blood-letting. Two cases are mentioned by Dr. Rush,‡ as being cured by this practice; to which, I add, with great pleasure, a third, lately communicated to me, from a source of undoubted authenticity.

The disease, produced in the human species, by the bite of a rabid animal, is a state of malignant fever.

To give regularity to this section, I shall arrange the arguments under distinct heads, as in the preceding.

1st. From the modus operandi of the canine virus. It is undoubtedly confirmed, not only from the analogy of other poisons, but from the effects of the virus itself, that its uniform operation is, to induce fever. The acute Dr. Brown has very correctly asserted, “that all stimulant, hurtful powers, are participant of one effect.” Thus, the operation of opium, alcohol, miasmata, poisons, the vicissitudes of heat and cold, contagions, &c. produce but one effect, which is fever; and, although the forms may be different, they are essentially the same. To admit the identity of the remote cause of disease, (viz. that it is stimulus) is confessing the unity of effect. Identity of cause, always implies identity of effect; and it is contrary to the nature of things, that the same cause (*cæteris paribus*) can ever produce a varied effect.

* Meade, p. 80. † Rush's Inq. vol. v. p. 214. ‡ Ibid. 231.

2d. From the symptoms. They are, loss of appetite, palid face, chills, languor, debility, heat, flushings of the face, heaviness, uneasiness, head-ache, anxiety, nausea, vomiting, with a burning sensation of the stomach, difficult and laborious respiration, white tongue, great sensibility to cold, a red, wild, and inflamed eye, delirium, coma, false vision, ardor urinæ, strangury, priapism, eruptions, glandular swellings, palpitation, spasms and convulsions.

3d. From the state of the pulse. By adverting to the pulse, as already described, it will be found, as variously affected, as in any other states of malignant fever.

4th. From the appearances of the blood. In some cases, it is sify ; but it oftener presents indications of much higher action. Thus it is generally remarked, to be so much dissolved, as scarcely to be con- cressible, when exposed to the air. This state of the blood always manifests great action of the arterial system.

5th. From the occurrence of similar symptoms, in other diseases, which are acknowledged to be states of fever ; as in the pneumonic, anginose, yellow fever, &c.

6th. From the appearances upon dissection. In bodies which have died of the disease, there have been observed, inflammation of the fauces, gula, and larynx ; inflammatory, and gangrenous appearances of the stomach, intestines, and urinary bladder ; effusions, inflammation, and congestion of the lungs, with simi- lar appearances in the brain ; large quantities of a dark coloured fluid in the stomach ; and the gall-bladder,

filled with a dark bile ; dark or livid spots on the surface of the body ; an unusual aridity of the viscera, and other parts ; and lastly, the arteries filled with fluid inconcreasible blood ; and the veins empty.

7th. From the success which has attended the employment of depletion, in the treatment of the disease.

The arguments, in support of this theory, are not yet exhausted. There still remains a source, from whence additional confirmation may be derived.

The inferences, deducible from the reciprocal similitude of the principal pathological characters of the yellow, and canine fevers, must stamp the fullest conviction of their identity.

They are both ushered in, by the phenomena of fever, in some instances, violent, and distinctly marked ; but sometimes slow, masked, and dangerous. It is common to both, that the subjects of the attack are prostrated by the vehemence of the impression, while others remain but slightly indisposed, for days.

They alike elect, as the principal seats of their attacks, the head, the thoracic and abdominal viscera ; but in either, the stomach is found the principal part affected.

Do not dissections prove, that the stomach, in yellow fever, contains a dark fluid (considered a morbid secretion) ; and does not the same occur in canine fever ?

They are both equally characterized by evident exacerbations and remissions ; and anomalously, by

two stages, the acute, and chronic.* They alike invade every part of the body, assailing the individual systems, and discovering in each, an identity of symptoms.

In the arterial system, they produce fever; which is manifested, not only by the pulse, but from other circumstances.

In the nervous system, they exhibit a different train of symptoms, according as the brain, nerves, mind, or muscles, are affected, producing head-ache, suffused face, inflamed eye, with dilated pupil, dulness of vision, or total blindness, hysteria, nausea and vomiting, vigilance, delirium, fever, frightful and alarming dreams, coma, and paralyses.

The muscles, in the close of both diseases, are often possessed of a preternatural excitement; hence the occurrence of spasms and convulsions.

In the cutaneous and glandular systems, appear profuse salivation, eruptions, as erysipelas, petechiæ,† and glandular swellings.

They affect the thoracic and abdominal viscera. In the lungs producing cough, difficult respiration, pneumonia vera and notha. In the alimentary canal, the stomach is affected with anxiety, nausea, flatulency, sensation of heat, great irritability, vomiting, &c. The bowels with pain, and obstinate costiveness. They affect the other viscera by inflammation, and often congestion: and the urinary bladder particularly; occasioning dysury, strangury, &c. In short, the two

* Arnold's case of chronic hydrophobia, and V. Sweiten relates a case extremely protracted.

† Arnold's case.

diseases are perfectly analogous, in their type, the duration of their course, and termination. They both attack, sometimes with such violence as to terminate life in a few days, with spasms, convulsions, and marks of pain; but in other instances their progress is retarded; and the last scene is mild and serene, without any marks of commotion, or inquietude of the system.*

I have more than once hinted, that this disease materially affects the lungs. It appears, that by far the most common mode of attack, is that of the varied forms of the pneumonic state of fever, and particularly pneumonia notha.

From a review of the dissections which have been detailed, it evidently appears, that the lungs are particularly affected. Indeed, in many cases they have been so completely *engorged*, as to have acquired considerable solidity. Admitting then the existence of this state, a solution is furnished to many of the phenomena of the disease, which have hitherto baffled every attempt to explain them. Instructed by anatomy, that an interruption in the pulmonary circulation is necessarily followed by a determination of blood to the head, there can be no hesitation in referring the different affections of the brain which so

* "The scene was closed with several of the most beautiful smiles."
Babington's case.

Dr. Rush, in his account of the yellow fever of 1793, says, "the disease ended in several ways. In some it was sudden, in others it came on by gradual approaches. In some the last hours of life were marked with great pain and strong convulsions; but in many more, death seemed to insinuate itself into the system, with all the gentleness of natural sleep." He goes on, and relates several instances of persons who died "with smiles on their countenances." p. 78....9.

uniformly occur, to this cause. The symptoms of phrenitis, and disordered vision, sufficiently indicate that the brain is materially affected; and whilst an equal argument is derived from the convulsions, and paralysis, which ensue in the close of the disease, they may be explained, by referring them to a depressed state of the organ.

That the pulse should be in some instances regular, at other times preternaturally slow and depressed, is no longer mysterious or inexplicable. They are states of the arterial system, precisely such as we should expect, and what do occur in pneumonia notha, and the consequent state of the brain.

It has already been proved by the authority of different writers, that cases of hydrophobia have been ushered in, and attended with all the symptoms of pneumonic affection; and in some instances, this affinity has been so striking, that they have been supposed a common catarrhal or pleuritic attack, till the appearance of the distressing symptom of the aversion to water, has removed the impression.

There is scarcely a prominent phenomenon of this disease, but what admits of an explanation by an extension of this reasoning. To prove this, it will be only necessary to advert to the analogy of the symptoms of pneumonia notha, with hydrophobia.

1. Do chills, shiverings, yawnings, and stretchings, pains in the bones, lassitude, stitches in the side, with an inaptitude to muscular exertion, usher in pneumonia? So do the same train of phenomena mark the forming stage of hydrophobia.

2. Are they followed by heat, thirst, anxiety, oppression, difficult and laborious respiration, with pain and uneasiness about the præcordia and breast, in the one case? So they are in the other.

3. Is the more advanced stage of pneumonia marked with an increased difficulty of respiration, restlessness, a total incapacity to sleep, red and inflamed eyes, delirium, with an aggravation of the disease, by a recumbent or horizontal position? The same circumstances obtain in hydrophobia.

4. Is there, in some instances, a sudden debility and prostration in pneumonia? So there is in hydrophobia.

5. Does not the pulse, in both diseases, sometimes continue regular, and little disordered; and in other instances irregular and intermittent, according to the force of the impression?

6. In both diseases, do not dissection prove that death is induced by an engorged, or suffocated state of the lungs?

The aversion to fluids, which has been considered as stamping a specific character upon this disease, and distinguishing it from all others, has not unfrequently occurred in pneumonia.*

From these considerations, I am induced to adopt the opinion, that the disease induced by the bite of a rabid animal, is a state of fever of the highest possible grade; invading the whole body, but assuming, most uniformly, the form of the pneumonic state of fever.†

* Theodon's case. Bonetas.

† I do not, by any means contend, that the disease universally assumes, the form of pneumonia; like the yellow fever, it invades every part of the body, but that it more commonly attacks the lungs, is clearly, I think, proved.

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METHOD OF CURE.

THIS part of the subject may be divided into first, Prophylaxis, or such remedies as are proper to remove, or counteract the virus, when received into the system.

2d. The therapeutic, or the treatment after the disease is formed.

I am induced to give a succinct sketch of the catalogue of preventive remedies which have been ushered into practice, to prove, that while they have flattered in prospect, they have almost universally disappointed in application; and in order to guard against the fatal security which has been imposed by a confidence in their powers.

It appears that, the ancient physicians decidedly preferred general remedies, to answer the prophylactic indication; accordingly, their writings abound with recommendations of remedies of this description, but “which rather serve to shew the credulity of their authors, than to furnish us with proper means of combating the dreadful consequences which follow.”

The use of the cold bath, which was originally advised by Celsus, has received the most strenuous advocation from many subsequent writers, among whom Van Helmont, Boerhaave, and his commentator, Van Sweiten, are prominent. The evidence of its success, is, however, too doubtful to command any degree of confidence. There are no authenticated cases of its advantageous employment, and many might be adduced, in which it was of no service.

It is not necessary to notice the empirical prescriptions of Galen, Pliny, Ætius, and the other early writers. They were accredited at the time, but have long since been entombed with their authors.

The *cineres cancri usci* seems to have been the remedy most generally employed at this period. The confidence in its virtues was almost unbounded. Its properties sufficiently prove it, to be totally void of efficacy.

Dr. Meade, a physician equally distinguished for his learning and credulity, in an essay upon canine madness, introduces, with the most extravagant commendations, a prophylactic, which he called *Dampier's powder*, from his having derived it from a gentleman of that name, composed of ingredients inert, and utterly destitute of active properties. This bantling of folly, obtained almost an universal sway in the practice of the time; for so imperious was the authority of its author, that it would have been deemed heresy, to have questioned its virtues. It still retains the confidence of the vulgar, but has long been rejected from the practice of scientific physicians.

A medicine, composed chiefly of pewter filings, was, many years ago, recommended by sir Theodore Mayerne, as a certain specific against the disease. It obtained no small degree of currency ; but repeated experience has proved it to be a deception.

The tonquin remedy, so extensively celebrated, has not proved more successful. Many instances might be adduced in support of this assertion ; but the well known case of admiral Rowley's son, in which it was fairly tried, sufficiently establishes the point.

Although the credit of the ormskirk medicine, has been so widely circulated, and admitted even by philosophical physicians, I cannot believe that it is better entitled to confidence, than the many other remedies which have been noticed. The numerous well-attested instances of its failure, should, at least, create hesitation in its employment, if not complete scepticism, as to its virtues. That this remedy, together with others, should have acquired credit, as preventive of the accession of the disease, is not astonishing; when it is considered that but a small portion of the number that are bitten by a rabid animal, are liable to the attack ; that when the saliva is actually introduced into the wound, many circumstances may prevent its taking effect ; and that there is often great room to conjecture, as to the madness of the animal.*

* I know, says Mr. Hunter, where there were twenty-one people bitten by one dog, nothing was done for any of them, and only one was taken ill. If they had all taken medicine, then it would have been said that they only lost one out of twenty-one.

Among the numerous prophylactics which have been recommended, none has attracted more general attention than mercury. There is scarcely a practitioner who has had occasion, but what has employed it; and many with adding further confirmation of its powers. It does not appear, however, to warrant the high commendations which it has received. There are many cases related, of persons escaping the disease, who were salivated; but an equal number are recorded of its failure. From this it would appear, at least, an ambiguous remedy.

Rejecting, then, the foregoing means of prevention, as totally ineffectual, I shall recommend, to answer completely the indication, the following practice:

As early as is admissible, after the infliction of the bite, a complete excision of the part wounded, should be performed; and to be followed by the application of cups, in order to produce a profuse effusion of blood. An extensive inflammation and suppuration, should then be excited, by the means of the most irritating agents. With this view various remedies have been employed; such as the red precipitate, and sublimate, common salt, the spirit of turpentine, cantharides, &c. The solution of cautic has also been strenuously advised. They all act precisely in the same way. To the use of the cautic, I have no hesitation, however, in giving a decided preference, as being not only more convenient in application,

Dr. Vaughan, also relates, that of between twenty and thirty persons who were bitten by the dog, only the single case which he has recorded, was affected, p. 56. It is said, by Dr. Houlston, that out of nine persons bitten by the same dog, only one was affected.

Letter to Dr. Hamilton.

but most powerful in its agency. To be effectual, the wound should not suddenly, be suffered to heal. It would always be adviseable to keep it in a state of suppuration for several weeks.

Under the impression that the canine virus is never absorbed, but that its effects are produced by local irritation, propagated and extended, by the medium of sympathy, I should never hesitate in advising the excision of the part, at any period previous to the attack ; and the same treatment, as in recent cases, if the time was not so remote, as to remove all probability of an attack.

To the universal employment of this practice, there are some objections, and the occurrence of circumstances that will prevent its adoption. Thus, “ much time may be lost before the surgeon arrives; the sufferer may long resist all solicitations to submit to the knife; the wound may have been inflicted on the face, or near some large blood-vessel; or there may be so little probability of the madness, as to render it unjustifiable to subject the patient to present pain, and future deformity.” In such cases, the treatment originally proposed by the benevolent Dr. Heysham, should be substituted. The summary of his advice is conveyed in the following extract : “ When a person is bitten, the plain and obvious means of preventing any future injury is, first, to wipe off the spittle with a dry cloth, and then to wash the wound with cold water. After a plentiful effusion of it, warm water may be applied with safety and advantage, and not slightly and superficially, but abundantly, and with the most persevering attention. A continued stream

of it poured from the spout of a tea-pot or tea-kettle, held up at a considerable distance, is peculiarly well adapted to the purpose." Added to this treatment, Dr. Percival suggests the propriety, as an additional security, of bathing the wound with the gastric juice of an animal recently killed. The astonishing powers of this fluid, as a solvent, and neutralizer of poisons, render it probable that it might prove serviceable; but, as the procuring of it, is attended with difficulty and delay; it is not likely that it will be employed.

In noticing the foregoing remedies, I do not wish it to be supposed that I would exclude the excision of the part, in any case where it could possibly be practiced.

I am convinced of its decided superiority over every other mode of prevention. It is a remedy, in the prompt and judicious execution of which, there is the utmost certainty of success.

During the use of the preventive remedies, a low diet should strictly be enjoined: "The system, in this case, bends beneath the stimulus of the morbid saliva, and thus obviates, or lessens its effects, at a future day." To inspire hope in the patient, by creating confidence in the remedies, is a highly important consideration. The operation of fear, in producing a predisposition to disease, is well established. This effect is often noticed in the histories of plague and yellow fever.

In the vicissitudes of theory, which mark so strongly the history of this disease, very opposite methods of cure have been advanced.

I shall pass over, unnoticed, the various treatments contained in the early records upon the subject. They are dictated by false theory, and are not only erroneous, but often absurd and ridiculous. Indeed, to detail the progress of opinion, or recount the modes of cure which have prevailed, would be to repeat the history of error, and the melancholy record of the uncertainty of medical testimony.

At this period, two opposite modes of cure exist, each supported with all the confidence which is inspired by a conviction of the correctness of the theory from which they are deduced. On the one hand, large and copious depletion is strenuously advised, from an opinion, that the disease is of the highest possible grade, whilst an opposite impression has dictated a practice directly opposed to the former, consisting in the use of the cold bath, and the most powerful tonics.

The assumption, that tetanus is founded in debility and relaxation ; and a deduction, from a supposed analogy between the disease and the canine fever, have imposed the latter practice. Having, I trust, already proved, that the data which support this reasoning are false, I shall not here renew the inquiry, but proceed to the immediate detail of the modus medendi, derived from the theory I have embraced.

From the vehemence of the attack, and the impetuous progress of the disease, remedies the most prompt, and decisive in their operation, should be employed. None can answer this view so effectually, as *blood-letting*. It acts more directly and expeditiously, than any other mode of depletion. To

bleed in hydrophobia, is not a novel practice. The doctrine taught by Boerhaave, of the inflammatory nature of the disease, lead to its very general use ; but it has seldom been fairly tried. Even the ease, attended by professor Rutherford, whieh has been so often referred to, as an evidence of the failure, if not of the impropriety of the praeticee, appears to have been lost from the *limited and insufficient bleedings.* At the very time, when the praetice was abandoned, the indieations, most vehemently and clamorously, called for the profuse repetition of the lancet. To be effectual, it should be employed to the extent of two or three hundred ounées. Let not the reader be startled at this extent of depletion. It is justified not only from the force of the disease, but sanctioned by its use in other malignant fevers. The practice should not be employed, if limited ; for it only augments the force of the disease, by removing, in part, the cause which depresses its strength. This effect was often remarked, in the treatment of the yellow fever. The state of the pulse, and the apparent degree of debility, ought not to deter from this copious depletion, if it is ealled for, by other circumstanees. They are states highly insidious, and may be explained by referring them, either to an engorgement of the lungs, or to a general prostration of the system from the violence of the impression. In either case, the practice is equally indicated.

The use of the lanect in this disease, is not only recommended by its analogy with other fevers, but is enforced by the pulse, the symptoms, the appearanecs upon dissection, and the following instances of its

successful employment, assisted sometimes, by other depleting remedies.

Dr. Hartly cured a man of the disease, by the loss of one hundred and twenty ounces of blood.*

A case was cured by Dr. Nugent, " by two profuse bleedings," with the co-operation of sudorifics.

Mr. Poupart cured a woman by bleeding *ad deliquium animi*.

Three cases are related by Dr. Hillary, of his having cured by bleeding, conjoined with other depleting remedies.†

An account is furnished by Bergen, of a number of persons who received the disease from the bite of a rabid animal, all of whom died, except two, who were preserved by this remedy.‡

A case was successfully treated by Mr. Falconer, by " a copious bleeding," and a salivation.||

Mr. Wrightson also mentions a successful termination of a case of the disease, by the use of the same remedy.§

Dr. Rush mentions a case having been communicated to him, which was cured by Dr. Le Compe, by " copious and repeated bleedings, assisted by the use of mercury."**

In the third volume of Duncan's Medical Commentaries, Dr. Tilton has communicated a case, cured by *the liberal employment of bleeding*. He was lead to try the remedy, from having read of a case cured by a

* Trans. Roy. Soc. Lond. vol. 40. † Hillary on the Diseases of Barbadoes.

‡ Bibliothique Choisie de Med, tome 15, p. 212.

|| Med. Trans. § Ib. ** Rush's Inq. vol. v. p. 229.

profuse hæmorrhagy from the temporal artery, brought on accidentally.

The remarkable case recorded by Dr. Innes, which I have had occasion before to refer to, was cured by the loss of an hundred and sixteen ounces of blood.*

I am not disposed to conceal, or deny, that bleeding has been sometimes ineffectually used in this disease; but such cases certainly do not argue against its propriety, or forbid its employment. The same want of success has often attended its application in other diseases, in the treatment of which, it is still held indispensable. It has proved ineffectual, and consequently sustained a loss of credit, solely, from its injudicious use as to time, and restriction in degree. What would have been the issue of the practice in the recent malignant fever of Philadelphia, a disease of much less violence, by the limited depletion that has generally obtained in hydrophobia? Let the experienced practitioner declare.

As auxiliary to bleeding, some advantage may doubtless be derived from the various other modes of depletion. Instructed by the symptoms, (which is confirmed by dissections) that the stomach often is oppressed by an accumulation of vitiated bile; emetics promise great advantage. They not only discharge the offensive and irritating matter, but equalize the excitement of the system, and deplete, by creating perspiration.

In the low depressed state of the system, there is no remedy which will be so adviseable. Dr. Rush

* Edin. Med. Essays, vol. 1. p. 226.

recommended their use, under the same circumstances, in the yellow fever, and with the happiest effect.

Cathartics, considered as evacuants, must be regarded as useful remedies. They act, not only by discharging acrid fæces from the bowels, but also by determining the excitement from the blood-vessels, and consequently reducing the fever. Perhaps more might be expected from the frequent employment of enemata. The cure, of a case of the disease, is attributed by Dr. Coste to this practice.

Influenced by a conviction, that the lungs are frequently the seat of attack, and that they are materially affected, I consider the application of blisters as highly adviseable. Whatever may be the truth of this opinion, there can be no doubt as to the propriety of the practice. It is called for by the cough, the dyspnæa, and many other symptoms.

It has been said that mercurial frictions, largely employed, have proved serviceable.

I can readily accredit it. All the advantages are to be expected here from a salivation, which have been experienced in other malignant fevers.

Several of the cures which have been related, were assisted by this remedy. It acts, by diverting action from other parts, and by actual depletion. There is but one objection to its use, which arises from the rapid progress of the disease, scarcely allowing time for the mercury to take effect.

The use of the warm bath has sometimes been found to afford relief. In the case related by Dr. Fothergill, it evidently produced a temporary mitigation of the symptoms. But the horror attending

the sight of water to the patient, in most instances, is sufficient to deter from its employment.

The cold bath has long been known as a remedy. It was as early employed as the time of Celsus. There are some cases recorded of its success, but they are entitled to little credibility. The same objections apply here as to the warm-bath. Perhaps it would be preferable to apply the water in the form of effusion, or, where the sedative operation of cold was required, by the use of cold applications to the body.

Another means, lately introduced into practice, is the use of oil internally, and employed by way of friction. With a view of diminishing the morbid sensibility of the system, frictions to the body promise much service. The practice of immersing patients in a bath of oil, is mentioned by Celsus,* and other ancient writers.† It has lately been revived by Dr. Simmes, of London; and who, by the liberal use of the oil internally, and at the same time bathing the body, affected a cure.‡

I shall say nothing here of the use of the concrete acids, the hydro carbonates, &c. which have been lately recommended.

No evidence of their utility has yet been furnished. As great advantage will probably be derived from the exhibition of as much “chopped hay, or bread pills.”

There yet remains an important indication to consider. It is, to remove the distressing affection arising from a difficulty of deglutition. For this purpose, the

* Celsus, lib. x. † Artæus, c. 17.

‡ Case related by Dr. Shadwell.

application of cataplasms to the throat, have been recommended. They should be composed of the most stimulating ingredients.

In the close of the disease the same advantage will be derived from blisters, and stimulating cataplasms, which has been experienced in other malignant fevers.*

In the recommendation which I have thus given of various remedies, I beg that it may not be understood that I wish their employment to supersede, or even lessen the practice of blood-letting. They have been advised only as auxiliary to this remedy. From the lancet the most flattering prospects of success are furnished. It is "the anchor of hope"....I had almost said, the "unicum remedium"

It is impossible to contemplate the success which will attend the practice, deduced from the theory of the disease, advanced by Dr. Rush, without feeling disposed to pay homage to its benevolent and illustrious author. If a civic crown was formerly bestowed on the man who preserved the life of a Roman citizen, what commendation should he receive, who has cured a disease, and thereby rescued thousands from

* Dr. Physick, from an opinion, that death is often induced in this disease, by a spasmodic contraction of the trachea, so as to prevent respiration, has recommended, in such cases, the operation of tracheotomy.

The opinions, or even suggestions, of such a distinguished character are always entitled to consideration. In the present instance, I have some doubts as to the correctness of the opinion, or the propriety of the practice. I should rather attribute the difficult and laborious respiration which occur towards the close of the disease, to an engorged state of the lungs, and which would be most effectually relieved by *copious blood-letting*. However, the practitioner will be controlled by the conviction which will be formed from the particular circumstances of the case he may attend.

a state, infinitely more to be deplored than even death itself. Posterity shall do him justice. When his enemies and base calumniators, shall cease to be known, only from their infamy towards him, the recollection of his name shall endure, as long as virtue is admired, or talents and eminent services estimated. It will be the brightest star of the galaxy, in the historic page of American science and philosophy.

I shall close the consideration of this disease, "by comparing it to a deep and dreary cave, in a new country, in which ferocious beasts, and venomous reptiles, with numerous ghosts and hobgoblins, are said to reside. The neighbours point at the entrance of the cave with horror, and tell of the many ravages that have been committed upon their domestic animals, by the cruel tenants which inhabit it. At length a school-boy, careless of his safety, ventures to enter this subterraneous cavern, when ! to his great delight, he finds nothing in it but the same kind of stones and water he left behind him, upon the surface of the earth. In like manner, I have found no other principles necessary to explain the cause of the disease, and no other remedies necessary to cure it, than such as are admitted in explaining the causes, and in prescribing for the most simple and common diseases."

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